

Culture



Route 66's centenary

The wheel deal

CHICAGO TO SANTA MONICA

How an archaic, century-old highway helps explain America

THE "MOTHER ROAD" was what John Steinbeck called it in "The Grapes of Wrath"; the Joads drove west from Oklahoma in search of a better life in California. Nat King Cole sang that it was where you "get your kicks". It gave its name to a popular network TV show in the 1960s and inspired the plot and setting of Pixar's "Cars", an animated film from 2006. It is the path of one of America's most popular road trips.

Route 66 became the most famous highway in the world partly due to good timing. Its heyday coincided with America's cultural and geopolitical rise and the emergence of car culture. This year the route turns 100. And though the modern interstate is more efficient, it is far less colourful. America is turning 250 in a divided, uneasy time. The best antidote for the birthday blues is to drive all 2,400 miles (3,860km), from Chicago to Santa Monica, on the Mother Road.

Though it began as a motley stitching of state and local roads—not until 12 years after its inauguration did it become the first fully paved American highway—it quickly became the main route west, passing through eight states. Farmhands used it to flee the Dust Bowl; so did workers, many of them African-Americans from Texas and Oklahoma, who flocked to California's booming industrial base after the second world war; merry holidaymakers travelled along it to Los Angeles. During

Route 66's early years, more people got behind the wheel, thanks to Henry Ford's affordable Model T. Services for drivers flourished, including petrol stations, diners and motels, as did the small towns through which the route passed.

But with just a single lane in each direction, the popular route turned into a car park. Dwight Eisenhower, America's president, had been impressed by Germany's autobahn while serving in Europe during the second world war. In 1956 he signed the Federal Aid Highway Act to fund a system of multi-lane interstate highways. In the subsequent decades some new highways paralleled Route 66; others simply built over it. As a federal highway it was decommissioned in 1985.

That could have been the end of the story. But grassroots organisations formed to preserve and protect Route 66, in line with the observation of Alexis de Tocqueville from nearly two centuries ago: "Americans...are forever forming associations...at the head of any new undertaking."

That is the first lesson from Route 66: for all the hands wrung and pixels blazed about the social atomisation wreaked by the digital age, Americans retain their heartening passion for in-person voluntarism. All eight states have volunteer-led groups devoted to preserving and promoting Route 66. Cheerful, garrulous volun-

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An event horizon marks the point beyond which gravity so warps spacetime that nothing, not even light, can escape. An object that crosses the horizon is cut off from the rest of the universe, with all possible roads leading to the black hole's centre. Event horizons are invisible, although their effects can often be seen when a black hole is swallowing hot, glowing gas. Physicists nevertheless know a great deal about how they work, thanks to Albert Einstein's theory of general relativity. But physics is an empirical science as well as a theoretical one. Dr Ma thought that gravitational waves might offer a way to check that Einstein's theory does indeed match reality at the boundary of a black hole.

General relativity predicts that as two black holes collide and merge, the properties of the new hole's event horizon should be imprinted on the gravitational waves released. To test this, Dr Ma teamed up with physicists from LIGO, who are used to interpreting the complex signals that show up in their detectors. Since the wave detected last year is the clearest from a binary merger so far detected, the team focused their attention there. Sure enough, they were able to decipher the part of the signal in question. And it matched their theoretical prediction exactly.

The team's new technique provides an unprecedented view of the bizarre environment just outside an event horizon. Here light loses energy as it attempts to climb out of the black hole's immense gravitational field. That makes objects approaching the horizon appear redder and redder to outside observers. As the black hole rotates it tugs the fabric of spacetime around with it, warping distances and the passage of time. The physics of both of these effects are captured in the rumble of the gravitational waves, allowing physicists to probe gravity at its most extreme.

Or nearly its most extreme. Hidden behind the event horizon, at the heart of the black hole, is an even stranger region: the singularity. There the gravitational field is so intense that Einstein's theory starts to give nonsensical results. Most physicists see that as a hint that some new, more fundamental theory remains to be discovered—probably one that combines gravity with quantum mechanics, a feat that has eluded physicists for decades.

Event horizons are as close as the universe allows physicists to get to singularities. That makes them "very interesting from the point of view of understanding the incompatibility between quantum mechanics and general relativity", says Nicolas Yunes, a physicist at the University of Illinois Urbana-Champaign, who was not involved in the new study. He hopes that "whispers of quantum-gravitational effects" may linger near the event horizon. Now it may be possible to check. ■

Well Informed

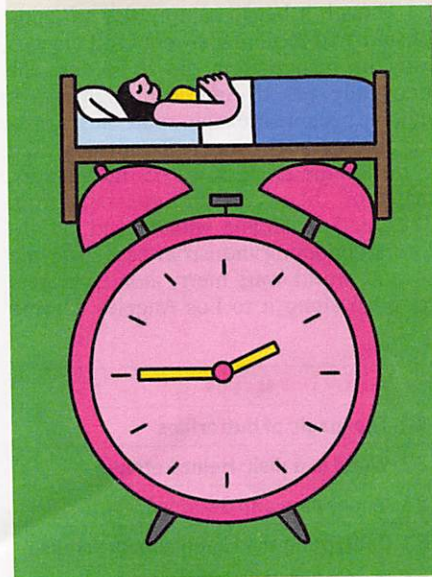
Moderation in all things

Is too much sleep as bad as too little?

"EIGHT HOURS labour, eight hours recreation, eight hours rest," said Robert Owen, a Welsh textile-maker, in 1817. His aim was a fairer work week, but the idea that sleeping eight hours a night is best has since become the received wisdom. Is it right?

Not getting enough kip can certainly be a problem. A bad night's sleep can lead to a drop in cognitive abilities, increased stress and general grumpiness the following day. Chronic sleep deprivation is associated with cognitive decline, psychiatric disorders and even an early death. But too much sleep may also be bad for you. The evidence suggests a U-shaped relationship between health and sleep duration, with both insufficient and excessive slumber being worse than an optimal middle range.

In 2015 two big studies tried to work out exactly where that range lies. The first, published in *Sleep Health*, assessed 575 studies published between 2004 and 2014. For those aged 18-64, the recommended amount was between seven and nine hours a night, but that fell to just seven or eight hours for those over 65. The second, published in *Sleep*, analysed 311 studies. It concluded that around seven hours of shut-eye was the best target, but noted uncertainty about the negative effects of regularly sleeping longer than nine hours.



A more recent study, published in *Nature* on May 13th, refined these estimates by studying the effects of sleep duration on specific parts of the body. Its authors used the idea of "biological clocks", which try to work out whether a person's physiology is in better or worse nick than their chronological age would suggest. The researchers applied the concept to individual organs. Someone with a brain pathology, for example, might have a "brain age" that is higher than their actual age, explains Junhao Wen, a computational neuroscientist at Columbia University and self-admitted light sleeper, who led the study. Someone sporty might have muscles that look younger than their years.

Dr Wen and his team tracked the relationship between sleep duration and 23 different biological clocks across 500,000 adults (much of the data came from the UK BioBank, a big database). They found the U-shaped pattern across nine body systems, including the brain, lungs, liver and skin. Their findings suggest that the optimal amount of sleep is 6.5-7.8 hours for women and 6.4-7.7 hours for men.

Those struggling to get a full night's rest should not despair. Applying population-level results to individual lives is tricky, for one thing. For another, disentangling cause and effect is not easy. Are some organs prematurely aged because their owners sleep too little? Or is some other factor causing both the ageing and the lack of sleep? Besides, says Michael Grandner, a psychiatrist at the University of Arizona, duration is just one measure. Quality, regularity and continuity of sleep matter, too. His advice is: "Don't freak out about any particular number, unless it's a very unusual number."

That looks like sage advice. One irony of sleep is that worrying about it can make things worse. A 2025 survey from the American Academy of Sleep Medicine found that 76% of respondents had lost sleep due to worries about sleep. Dr Wen advises listening to what your body is telling you, and getting enough that you feel refreshed when you wake up. Aim for six to eight hours a night, in other words, but don't toss and turn over the precise number.

gration from Texas by converging like flames in the trees. One doctor found butterflies scratched "everywhere" on the bar-rack-walls of Polish death camps. Far closer to home, a small tortoiseshell kept visiting Ms Korsgaard's mother after her own mother's death, apparently—explicitly, she thought—to comfort her. When she set out on her quest, a small tortoiseshell was the first butterfly she saw. "A room of light", she writes, "had opened inside me."

This message, she feels, must have to do with metamorphosis. That extraordinary process is a passage from apparent death (the chrysalis, which she too pokes obsessively as it rattles in a glass, thinking it can't possibly be alive) to the creature that emerges to cling to a stem and unfurl its glorious wings. She links this not just to religious teachings of resurrection, but to the belief of Kant and Hegel in human perfectibility through reason; and the conviction of economists (including *The Economist*) in the general inevitability of human progress. The butterfly is the great symbol of the theory that, through striving, perfection is possible.

Yet the butterflies she seeks are in steep decline. Between 1993 and 2023, the 22 rarest varieties in Denmark's South Sea Islands and Zealand lost nearly three-quarters of their habitats. In 1938 there were swallowtails all over Jutland, even in the dunes; 40 years later, they had stopped breeding there. She had noticed herself that there were far more fritillaries around on her childhood bike rides than now. Climate change and modern farming methods are taking their toll. She begins to panic that species might die out before she sees them, or that she might die before recording them. Thoughts of death, as well as life, spur her on.

The other meaning of butterflies is harder to explain. She is embarrassed to mention it, but she has to account for her own determined searching and the intensity of her experience when she is out in nature with them. It is not just the triumph of crossing off white-letter hairstyles and holly blues from the long list pinned to the fridge. What she feels, as she rests on one elbow in the company of a northern brown argus, is an overwhelming sense of connectedness with both it, and all things; what Vladimir Nabokov, an ardent lepidopterist, called "a sense of oneness with sun and stone".

On a tender trip with her game and elderly mother, looking for skippers (almost her last remaining butterflies to spot), she also sees what she can only call "eternity". She has been born anew, but has always existed; hope is "perpetually fulfilled with life that gushes from life". She realises then that the point of her quest was not just the collecting of fascinating creatures. It was the recollecting of herself. ■

World in a dish

Seeing red

Heinz tomato ketchup and the sweet taste of market dominance

EATING HABITS have changed a lot in the past 150 years. Offal and jellied eels rarely make it onto Britons' and Americans' plates any more. But one food product has remained a staple since it first hit shelves in 1876: Heinz tomato ketchup.

Heinz says it sells over 650m bottles of the red stuff every year (meaning that more than 1,200 bottles land in shopping baskets every minute). Its factories process enough tomatoes each day to fill an Olympic swimming pool. The ubiquity of its ketchup is partly a matter of taste and partly a triumph of marketing.

Versions of the condiment long predated Henry J. Heinz, a son of German immigrants to America. Ketchup is probably derived from *ke-tsiap*, a sauce made in Asia from fermented fish. It is thought British and Dutch traders encountered the salty, savoury sauce in the late 17th century and tried in vain to recreate it at home. Recipes often used mushrooms, but others made ketchup with plums or walnuts. (In the 1800s, the spelling "catsup" was also used.)

It was in the early 19th century that Americans developed a taste for tomato ketchup, plopped on eggs and corned beef hash or liver. Early versions of the sauce, however, were watery and spoiled easily. Manufacturers would package their sauces in coloured bottles to hide evidence of bacteria or mould; they would also use preservatives such as sodium benzoate and dyes

made from coal tar. Many consumers, even then, wanted to eat clean.

So Heinz developed a ketchup that would not go off quickly, but was free from preservatives (or, as an advert pithily put it, "NOT drugged"). He used ripe tomatoes for a better flavour and colour, and vinegar to inhibit microbes. Crucially, Heinz sold his product in glass bottles, thereby signalling its higher quality.

"The beauty of Heinz is that it's not trying to be complicated," says Claire Dinhut, author of *"The Condiment Book"*: "It's the perfect balance of sweet and umami and tangy." That sweetness pairs well with salty foods; the tanginess cuts through greasy dishes. Cookbooks aver that it is so versatile it can be used in curries, fish dishes and breads. But for many Heinz ketchup is associated with the comfort food of childhood—chicken nuggets and chips—and (for Americans) July 4th celebrations.

Nostalgia helps explain Heinz's staying power. Marketing has entrenched its position. Heinz is among the best-known brands globally: according to YouGov, a pollster, 100% of Britons and 97% of Americans know it. By advertising itself as the default ketchup, Heinz has turned that message into a self-fulfilling prophecy. Even today, when there are umpteen other ketchups on the market—including cheaper and artisan varieties—many shoppers still believe that "It has to be Heinz." ■



teers staff small-town museums and roadside attractions; indeed, the route's vibrancy largely stems from the efforts of countless people who decided, each for their own reasons, that they want it to remain delightful and not fade into disuse and obscurity.

Bill Thomas, who chairs a national preservation group, the Route 66 Road Ahead Partnership, and is the head of economic development for Logan County, Oklahoma, sees preserving the route as a means to attract tourists. Atlanta, Illinois, a town of just 1,600 residents, claims 8,000 visitors per year. Atlanta's main attraction is the weird, wonderful American Giants Museum, devoted to enormous fibreglass statues that businesses used to draw customers' eyeballs and wallets. (Their unfortunate tendency to fall over sparked lawsuits and prompted their retirement.) The museum is an old Texaco petrol station; across the street, a fibreglass giant offers (or is preparing to club passers-by to death with) a hot dog the size of a park bench.

Such roadside oddities abound along the route. There is a motel of painted concrete tepees in Holbrook, Arizona. A little farther down the road is an abandoned mining town reinvented as an open-air museum of the Old West. There are also motorcycle museums, run by lovers of the open road who want to share their passion with the public.

Collectively these attractions provide the second lesson: America's economy is dynamic and productive, yes, but also intensely creative. American businesses are very good at making customers want to buy things. Advertising, done well, is an art. Though today it is often the province of big, expensive agencies, Route 66 contains hundreds of reminders that it can also be an individual endeavour, requiring little more than a few cans of paint and a memorable name (such as the Blue Swallow and the Wagon Wheel, both motels). Gimmicks work, too: if you finish a 72-ounce steak at the Big Texan Steak Ranch in Amarillo within an hour and without vomiting, your meal is free.

The final lesson is more of a reminder: that mobility helped America boom. People can move to a new city or state to find better opportunities and reinvent themselves. Yet fewer are doing so today. And politicians have grown suspicious of newcomers. The left hates the arrival of new middle-class Americans and wails about gentrification. The right hates the arrival of foreigners and complains about jobs being snapped up. Route 66 symbolises what has really made America great.

All along Route 66 you see that the country may be politically restive and divided, but it remains a warm, fascinating place, filled with at least as many wonders as flaws. Parts of the route—the harrowing

mountain passes between Cool Springs and Oatman, Arizona; the sere, striated mountains in New Mexico; the gently rolling flatlands and endless skies of Oklahoma—are breathtakingly beautiful.

Travelling the Mother Road also reminds Americans just how vast and hospitable their country still is. It has a far smaller share of grumps than you would encounter at an average airport. Its very inconvenience is the draw. "Nobody wants to drive 55 miles an hour when they can drive 75" on the interstate, complains one volunteer at a restored petrol station in Shamrock, Texas. People drive on interstates because they have to; they travel Route 66 because they want to.

Mr Thomas recalls how many foreign tourists tell him, "We're travelling Route 66 to see the 'real America'." And though of course Adrian, Texas, and Pontiac, Illinois, are no more "real" than Queens or Boston, road trips help you feel you are journeying to a deeper understanding of the nation.

Outside a café in Adrian, at the road's midpoint, a burly Frenchman called Vince looks out at the road he has just travelled and the one he is about to discover. Asked what drew him to a decommissioned highway in the middle of nowhere, he smiles and gestures towards his motorcycle: "For me, it's been a dream for a long time. And now, it's reality." ■

A Danish bestseller about butterflies

Fly-by

The Butterfly Season. By Lea Korsgaard.
Translated by Sherilyn Nicolette Hellberg.
Knopf; 320 pages; \$32. Particular Books; £24

ON THE FIRST day of a new year Lea Korsgaard, a Danish journalist, decided she would set out to see every species of butterfly in a single season. She did not know why. Her knowledge of *Lepidoptera* was almost nil. Between butterflies and moths, she could just about distinguish that the first sort were colourful and sun-loving, the second generally hairier and nocturnal. Nor did she need this mad quest. With a hectic job, a busy husband, a dog to walk and three young sons to bring up, she had more than enough to do.

Nonetheless, she set about it. She had 64 native species to find. The names alone were enticing: purple emperor, grizzled skipper, pearl-bordered fritillary. And it was an excuse to visit parts of Denmark she had not known before. So for a year she hunted, squelching through bogs, pushing



Flower power

her way through forests, clambering over banks and rocks, camera or phone in hand. Few butterflies did her the favour of simply flying past her kitchen window.

She cheated a bit, of course. First, she bought a batch of butterfly eggs online—but did not count them. Later, a species forum helped her confirm her finds instantly. She teamed up with experts online to arrange meetings at likely places, learning the proper way to walk when searching: four steps, a pause, slow scan of the area, four steps more (never let your shadow fall in front of you). In the end she became such an expert that she could distinguish the tiniest variations of colour on wing-dots or antennae from several feet away.

That necessary attention to detail feeds into the rest of the story. The Scandinavia of Karl Ove Knausgaard, slow-knitting videos and *hygge* (cosiness) is alive and well here, helping account for the book's huge success when it was published in Denmark. Ms Korsgaard does not merely draw up a butterfly list, but "the blue rows take shape on the long edge." While chatting in the car, she also notes her gear-changes. Scraps of conversation float in and out with no resolution. But this is all a useful contrast to the dense pages she devotes to the history, philosophy and mythology of butterflies. Her search is not merely to record the physical specimens in Denmark (lamentably fewer than in past times), but to find out what butterflies mean.

As she points out, they appear even in cave paintings and ornaments from the Bronze Age. To ancient peoples the world over, they represented souls. In Greece the goddess Psyche, the soul itself, had butterfly wings. In China they were the souls of the dead; in Mexico those of the ancestors, commemorated every November when orange monarch butterflies end their mi-